

## Claims

1. A diagnostic system for a modular fieldbus board carrying a number of fieldbuses connected to a bulk power supply, comprising a monitoring transceiver means adapted in use to one or more of the number of fieldbuses by means of two or more common mode and/or differential mode signal injection and/or signal detection points, which points are dispersed between the bulk power supply and the fieldbus trunk, such that the monitoring transceiver means can detect one or more fieldbus physical layer characteristics between two of the two or more of said points.
2. A diagnostic system as claimed in Claim 1 in which the fieldbus physical layer characteristics comprise one or more of: over/under termination, noise/ripple level, signal level, signal bias, signal jitter, signal ringing, signal distortion, signal attenuation, cross talk, unbalance, and earth leakage.
3. A diagnostic system as claimed in Claim 1 or 2 in which the monitoring transceiver means also detects one or more characteristics of hardware carried on the modular fieldbus board by means of one or more of said points.
4. A diagnostic system as claimed in Claim 3 in which the one or more characteristics of hardware comprise one or more of: voltage, short circuit, hardware module failure, quiescent current, and rate of charge.
5. A diagnostic system as claimed in Claim 4 in which the monitoring transceiver means is adapted to gather received data and produce one or more of: Fourier analysis, trending analysis, and data logging.
6. A diagnostic system as claimed in any of the preceding Claims in which the monitoring transceiver means is adapted to provide an alarm in the event that received data indicates one or more of pre-determined failures or the one or more fieldbuses.

7. A diagnostic system as claimed in any of the preceding Claims in which the monitoring transceiver means is provided with a first digital and/or an analogue interface, such that diagnostic data detected and/or alarms created by the monitoring transceiver means in use are transmitted to a digital or analogue device operated by a user, and such that commands are sent in use from the user operated digital or analogue device to operate the monitoring transceiver means.
8. A diagnostic system as claimed in Claim 7 in which the monitoring transceiver means is provided with a second digital and/or an analogue interface, such that diagnostic data detected and/or alarms created by the monitoring transceiver means in use are transmitted to other associated diagnostic systems.
9. A diagnostic system as claimed in any of Claim 6 to 8 in which the monitoring transceiver means is provided with visual means adapted to display diagnostic data detected and/or alarms created.
10. A diagnostic system as claimed in any of the preceding Claims in which the monitoring transceiver means is removable from the fieldbus board.
11. A diagnostic system as claimed in any of the preceding Claims in which the monitoring transceiver means is connected to the bulk power supply.
12. A diagnostic system as claimed in any of the preceding Claims in which one or more of the two or more common mode and/or differential mode signal injection and/or signal detection points are disposed within hardware carried on the board.
13. A modular fieldbus board comprising a number of fieldbuses connected to a bulk power supply, and a diagnostic system comprising a monitoring transceiver means connected to one or more of the number of fieldbuses by means of two or more common mode and/or differential mode signal injection and/or signal detection points, which points are dispersed between the bulk power supply and the

fieldbus trunk, such that the monitoring transceiver means can detect one or more fieldbus physical layer characteristics between two of the two or more of said points.

14. A modular fieldbus board as claimed in Claim 13 in which each of the one or more fieldbuses comprise a connection to the bulk power supply, a power supply converter, a power supply conditioner and a fieldbus trunk.

15. A modular fieldbus board as claimed in Claim 14 in which on each of the one or more fieldbuses a first common mode signal injection and/or signal detection point is disposed between the bulk power supply and the power supply converter, in which a second common mode signal injection and/or signal detection point is disposed between the power supply converter and the power supply conditioner, in which third a common mode signal injection and/or signal detection point is disposed between the power supply conditioner and the field bus trunk, and a differential mode signal injection and/or signal detection point is disposed between the third common mode signal injection and/or signal detection point and the fieldbus trunk.

16. A modular fieldbus board as claimed in Claim 15 in which a fourth common mode signal injection and/or signal detection point is disposed within the power supply converter, and in which a fifth common mode signal injection and/or signal detection point is disposed within the power supply conditioner.